should not exceed 3500 Ib. per square inch for small engine, and 5000 Ib. per square inch for larger engines.

In passing, it may be remarked that in all cases such screwed parts as the studs, also connecting-rod and crosshead bolts, usually have fine threads, and not the standard Whitworth thread.

The bearing surface should be such that the pressure per square inch does not exceed 250 Ib. per square inch of projected area, but with the ordinary design of high-speed engine and arrangement of cylinders the length and diameter of the crank-shaft is such that if nearly all of the space not taken up by the eccentrics and cranks is utilized for bearings, the pressure per unit area of surface is usually satisfactorily low. The outer low-pressure journal is usually made 10 per cent larger in diameter and about 33 per cent longer than the other, in order to take the weight of the fly-wheel. The pressure due to the weight of the fly-wheel alone should not exceed 100 Ib. per square inch.

The height of the bedplate should be such that the connecting-roc! bolt heads do not dip into the oil and so churn it up. The bottom floor of the bedplate should slope downwards towards the part where the oil pump is fixed, so that the oil may drain back to the pump strainers.

The bedplate should be designed in such a way that no part projects below the surface supported by the foundation, for convenience in erecting and grouting. The under surface should, of course, be machined. The holding-down bolts should be well distributed.

The oil pump is, of course, mounted in the lowest part of the bedplate. It is always of a simple oscillating type without valves or stuffing box, as originally introduced by Belliss and Morcom, and has no loose parts whatever, consisting merely of a barrel with trunnions, or their equivalent, the bracket in which the trunnions oscillate and which contains the suction and delivery connections, and the ports to the trunnions and the plunger. All the parts are of cast iron, except in the smallest sizes, when they may be of gun-metal. The plunger is driven by means of a pin engaging with a lug on one of the eccentric straps.

In large engines two pumps are fitted, each capable of serving the engine alone. This enables the strainers of each pump to be taken out and cleaned whilst the engine is running, a shut-off cock between the strainer and the pump suction being provided.

The connecting pipes to the bearings and other parts to be lubricated should be of iron or steel. Copper, although a convenient material to work, should not be used. It crystallizes and ultimately fractures, through the constant vibration to which these pipes are subjected.

A sump is provided in the bedplate to receive the drainings from the distance pieces of the mixture of oil brought up by the piston-rod and water from the glands. An ingenious separating device was introduced by Messrs. Belliss & Morcom, which depends for its action upon the difference of the densities of oil and water. Two vertical pipes are fitted in the sump in such a way that the level of the open end of one pipe is slightly higher than